SEMINAR ON NEW ENSILAGE FORAGE PLANTS

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To discover the state of research into new silage plants and its coordination, the board of directors of the Botanical Institute imeni V. L. Komarov of the Academy of Sciences USSR (BIN /Botanicheskiy institut imeni V. L. Komarova/) held a seminar-conference on 26-28 February 1962 of scientific workers and agronomists studying these plants.

Present at the conference were representatives of 24 scientific establishments and the Ministry of Agriculture RSFSR from five union republics and many oblasts of the Russian Federation. About thirty reports were read. Of these, we note the following: "New Ensilage Feed Plants, Problems in their Study, and Prospects for Advancing Agricultural Practice" (V. V. Sokolov, BIN, Leningrad); "New Ensilage Plants and their Significance in Establishing a Food Base in the North" (K. A. Moiseyev, Branch of the Academy of Sciences USSR, City of Syktyvkar, Komi ASSR); "Results and Further Lines of Research and Production-Test Studies with New Feed-Ensilage Plants in Belorussian SSR" (N. V. Smol'skiy and I. A. Kaurov, Central Botanical Gardens of the Academy of Sciences Belorussian SSR, City of Minsk); "Biological Properties and Chemical Composition of Certain Promising Perennial Ensilage Plants in Murmanskaya Oblast" (P. D. Bukharin, Polar-Alpine Botanical Gardens of the Academy of Sciences USSR, City of Kirovsk); "Results of Work with New Ensilage Feed Crops Under Conditions of Karelia for 1962" (G. N. Osipova, Karelian Branch of the Academy of Sciences USSR, City of Petrozavodsk); "Introduction of Wild Growing Ensilage Plants under Conditions of Western Siberia" (V. N. Guseva and E. M. Shumova, Central Siberian Botanical Gardens of the Siberian Branch of the Academy of Sciences USSR); "Results and Prospects for Work with Mallow and Other New Ensilage Feed Plants" (P. F. Medvedev,

Northwest Scientific Research Institute of Agriculture [Severo-Zapadnyy nauchno-issledovatel'skiy institut sel'skogo khozyaystva] of the village of Siverskaya, Leningradskaya Oblast); "Experience in Studying New Ensilage Plants at the Priyekul'skaya Selection Test Station" (A.Ya. Robezhniyek, Latvian SSR); "Results of Testing Ensilage Plants New to Bukovina -- Resin-Weed (Silphium L.) and Sakhalinskiy Knotweed" (E. I. Gritsak, Botanical Gardens of the Chernovitsk State University); "New Ensilage Plants Rich in Protein as Corn Supplements" (I. A. Rutskiy and S. I. Petrovich, Botanical Gardens of Voronezh State University).

Reporting on studies on Veyrikh buckwheat were the following: L. F. Yakimovskaya, and also I. I. Chekalinskaya (Central Botanical Gardens of the Academy of Sciences Belorussian SSR, city of Minsk), A. M. Chernyayeva (Sakhalin Complex Institute of the Siberian Branch of the Academy of Sciences USSR, city of Novo-Aleksandrovsk), A. P. Yakimov, and G. M. Balabas (BIN, Leningrad). Reports on Studies of the Sosnovskiy cowparsnip were given by N. A. Tokar' (Zhitomirskaya Bureau of Bee-Keeping), I. B. Sandina (BIN, Leningrad). I. I. Astakhov (Northwest Scientific Research Institute of Agriculture, Settlement of Siverskaya) reported on studies of the comfrey, and S. S. Khar'kevich (Central Botanical Gardens of the Ukrainian SSR, city of Kiev) and L. F. Nekrasova (Kiev Test Station on Animal Husbandry) -- on the Cardiophyllous colewort [katran serdtselistnyy]; on the tanning Alpine jointweed [Taran bubil'nyy] -- S. S. Khar'kavich, I. A. Pipinis (Institute of Botany of the Academy of Sciences Lithuanian SSR, city of Vil'nyus); on sakhalinknotweed -- V. A. Bogomaz (Bryanskiy Technological Institute); on sweet clover and mallow -- N. V. Artyukov (Laboratory of Agrochemistry, city of Yemanzhelinsk, Chelyabinskaya Oblast); on the Jerusalem and its hybrids with sunflower (topinsolnechnik) -- I. I. Marchenko (Scientific Research Institute of Animal Husbandry, city of Khar'kov) and V. K. Levin (Botanical Gardens of the Mordovian State University, city of Saransk); on the eastern goat's rue, several species of knotweed, and perennial lupin -- Yu. N. Tabachnikova (All-Union Institute of Feeds, Settlement of Lugovaya, Moscow Oblast).

From the reports read it was found that the number of new ensilage plants being studied and undergoing experimental-production testing is very large, more than 20 species. Several plants have been undergoing testing at many points of the Soviet Union for several years now. For example, species of the mallow genus in 1962 were tested at 70 points of the USSR. Different knotweeds are being quite widely tested -- Veyrikha, Sakhalinskiy, Zabaykal'skiy, and tanning Alpine jointweed. In Murmanskaya and Leningradskaya Oblast, in the Komi ASSR, the Ukrainian SSR, at Zhitomirshchina, in Belorussia and several other places the high productivity and cold-resistance of Soznovskaya cow parsnip and other species of this genus have been very highly rated. A very good rating has been given cardiophyllous colewort in the Ukraine, and in the Kievskaya Oblast (Animal Husbandry Station), and resin-weed Bukovina

(Chernovitsy, Botanical Gardens of the University).

Many years of testing at the Northwest Scientific Research Institute of Agriculture (th Siverskaya Station) and at other scientific and test establishments of the scabrous comfrey points to the large promise of this ensilage feed plant.

Especially sizeable successes in the study and introduction into cultivation of new ensilage plants have been achieved in the Komi ASSR Branch of the Academy of Sciences USSR. Here the following plants are being widely tested and also used: mallow, oil-bearing radish, wild mustard, Sosnovskiy cowparsnip, Veyrikha buckwheat, scabrous comfrey, butterbur. In the near future, as many seeds of these plants will be produced as are required for all its sovkhozes and kolkhozes, and in addition, some of the seeds will be sent for propagation in other northern oblasts.

Corn, horsebeans, sugar beet, and peas were not objects of discussion at the seminar, although they are being studied at different scientific establishments. The importance of these cultivated plants used for feed production has been fully determined. There are many varieties of these plants, special agricultural techniques have been developed for them and their plantings are being planned for in the millions of hectares.

Only new and in part old, but still poorly distributed ensilage plants received well-balanced evaluation at the conference, such plants as Jerusalem artichoke, white sweetclover, oil-bearing radish. We will choose some examples of the most promising plants.

Mallow is an annual plant of the Malvae family. It is marked by cold-resistance, early ripening, high yield of green mass and seed in northern farming regions.

The average yield of green mass of the mallow melyuka is 500-600 centners/hectare, of the mallow kurchavaya -- 450 centners/hectare, and mallow mutovchataya -- 370 centners/hectare. The green mass of mallow contains (on a dry weight basis) 17-20 % protein, 24-28 % gluten, 14-15 % protein [sic], 12-15 % ash, and 32-38 % nonnitrogenous extractive matter. The ash composition includes much calcium, potassium, phosphate, and iron. Ensilage of mallow is highly useful in feeding young steers.

Mallow withstands fall frosts to -5 - 6° and grows well during the chilliest of years. The plant is double-harvesting. The first harvest usually occurs at the end of July, and the second -- in September.

Knotweed or Veyrikha buckwheat is a perennial plant of the Polygonaceae family. The plant has the form of a very large raceme, with a set of stems and leaves. In contrast to sakhalinsk knotweed, its stems are not ligneous. It propagates by seed and rhizome. Successful experiments in its cultivation have been carried out in the Murmanskaya and Leningradskaya Oblasts, in the Komi ASSR, in Latvia and Belorussia, and also in other points. It contains much protein,

vitamins, and potassium. Therefore, silage made from it together with cowparsnip corn is very nutritive and useful for animals.

The green mass yield of Veyrikha buckwheat even by the second year of growth is significant -- up to 50-70 and more tons per hectare.

The Jerusalem artichoke or topinambur and its hybrids with sunflower -- topinosolnechnik. It must be noted that this is a long known, but unfortunately forgotten plant and now it must be rapidly and widely multiplied. This is an extremely high-yielding ensilage and forage (for hogs) crop. For ensilage, its above-surface and roots are used. The latter represent a good concentrated feed for all animals, especially for hogs, and also for fowl.

The green mass of the Jerusalem artichoke is easily ensilaged both in the pure form as well as in the mixture with other plants. Its plantings are used for 3-4 years in a row without additional expenditures. The yield is high -- the green mass provides up to 700 centners/hectare and more, and roots, depending on the region of cultivation, up to 350 centners/hectare. There is much inulin, calcium, phosphorus, and iron in the roots of the Jerusalem artichoke, which increases its feed value.

The white sweetclover is a biennial, a grassy, high-growing legume. It is distinguished by cold-resistance, winter-resistance, and is not demanding when planted on lean light and solonetz soils. It is double-harvesting, has good green mass and seed yields. In the nonchernozem zone, it succeeds well on soils rich in lime. It propagates by seed. The seeds must be scarified before planting, since they include many hardseeds, not sprouting during the planting year.

Sweetclover is important both as an ensilage, haying, fallowing, forage, nectariferous, and green-maturing crop.

This is not actually a new crop. Production plantings of it have long been known in Western Siberia, Kazakhstan, in the Volga area, in the Northern Caucasus, and in the Baltic republics.

Scabrous comfrey is a perennial plant of the Boraginaceae family. Even during May-June, it provides a high green mass harvest, rich in protein, devoured quite voraciously by hogs in the fresh and ensilaged form. It grows well after mowing and gives several cuttings during the summer. The plant is in the form of a large, abundantly leafed raceme. It propagates spermously and by root cuttings. Its seed ripens very unevenly, and is easily shattered, therefore picking is difficult. The use of the comfrey green mass begins from the second year of life and continues for 10 or more years. It yields 40-60 tons of green mass per hectare. The comfrey is a good nectariferous plant. It is grown as a feed plant in many countries.

Sosnovskiy cowparsnip is a perennial plant of the Umbelliferae family. It has enormous, up to 1-meter long leaves, and flowering shoot, extending to three and more meters high. In the Caucasus in several regions, for example in the Kabardino-Balkarskaya ASSR, it has long been ensilaged in mixture with different grasses. Experiments on raising sosnovskiy cowparsnip and its feeding to animals have been underway in the Murmanskaya and Leningradskaya Oblast, in the Koli ASSR, in Belorussia, in the Ukrain and in other parts of the USSR.

The advantages of sosnovskiy cowparsnip consist , above all, in its cold-resistance and winter resistance (it withstands freezing without harm to -7°), while its high green mass harvest, amounting to 100 and more tons per hectare during the second year of life, growth during many years in succession without replanting, its early-ripening (ripens during May-June) and excellent ensilage property. All these qualities elevate sosnovskiy cowparsnip to one of the leading positions among ensilage plants.

The chemical composition of sosnovskiy cowparsnip is distinctive. It contains much sugar (about 3 %) which assures its good ensilage property, a high vitamin A and C content, protein (16-18 %), protein [sic] (12 %), fat (3 %), carbohydrates (15 %). However, furocumarins, even though they are of important medical value, represent its negative feature as a feed plant. These substances, entering in droplet form from the plant sap on to human skin increased its sensitivity to solar rays. As a result, in several hours or in one-twy days watery blisters reminisent of burns appear on the skin (these blisters if not broken, usually collapsed in 1-2 weeks). Therefore it is recommended when collecting cowparsnip for ensilage to use precautionary measures -- wear mittens and boots, and collection should be conducted with machine in less sunny weather.

Rosin-weed (Silphium L.) is a perennial grassy plant of the Thistle family. This is a new ensilage plant, studied in the Western Ukraine, is marked by winter-resistance, early aftergrowth, good otavnost', high green mass yield, resistance to overmoist soil, extended period of economic utilization (not less than 10 years). The perennial plant reaches a height of 1.5 and more meters.

Rosin-weed propagates enormously and by clonal cuttings. The seeds are relatively large, 1000 weigh 26 grams. It is best planted in late winter or early spring. The green mass yield of the first cutting is upwards of 100 tons, and the second -- about 80 tons/hectare.

The plant is not demanding as to soil. The possibility of planting rosin weed on floodplain soils with near-lying standing ground waters, increases its value as an ensilage plant.

All seminar participants came to the same conclusion that efforts to find new promising ensilage plants must be intensified and not only in the flora of the USSR, but also in other countries. Favorable possibilities exist in searching for ensilage plants of the Soviet Union. In the flora of the Far East, on Sakhalin, Kamchatka, in the Ussuriyskiy Kray, and also in the Caucasus and in the Altayskiy Kray, there doubtless can be found promising ensilage plants. This is reported by the existence of such promising ensilage plants as Veyrikha buckwheat, maraliy root, and butterbur.

What plants do we need? They must be high-harvesting (in terms of green mass), have good spermous propagation, ripen early, and also contain adequate nutrient contents. Their sugar content must correspond to the so-called "sugar minimum," which permits the plant mass to be well ensilaged. In different geographical zones, these plants must exhibit winter-resistance, cold-resistance, or drought-resistance and provide high green mass harvests during summer and autumn ensilaging periods.

Many botanical establishments must become engaged in searching for and initially introducing new ensilage plants -- institutes, gardens, departments, while the All-Union Institute of Horticulture must carry out the delivery of seed materials from abroad.

For more successful and purposeful work with new ensilage plants, the seminar participants developed recommendational lists in which the most promising plants are listed together with the institutions in which it is desirable that their investigation and testing be undertaken, and in what particular lines of research. If these lists are distributed among the broad botanical community and undergo extensive and balanced discussion, then by the second conference on ensilage plants, which is scheduled to be held in 1964 in the city of Minsk, more improved lists can be prepared.

The conference in its resolution noted the importance of broadening work on a well-balanced study of promising ensilage plants at agricultural scientific establishments, along with their biology and chemical composition, cultivation, on mechanization of care and harvesting, organization of geographical testings, and also on selection and seed-raising, zootechnical evaluation, and development of ensilage methods.

The conference noted that in different parts of the enormous territory of the Soviet Union quite productive, highly valuable work promoting the strengthening of the fodder base and increased livestock productivity is underway. Many new ensilage plants are coming from the fields of kolkhozes and sovkhozes.

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